FFR: pitfalls

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Pitfalls can be related to....

Preparation

- Calibration
- Equalization

Measurement

- Drifting
- Hyperaemia
- Wedging
- Whipping

Tracing interpretation

- Cursor position

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Calibration

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‘teaching’ the system, what is *zero pressure*

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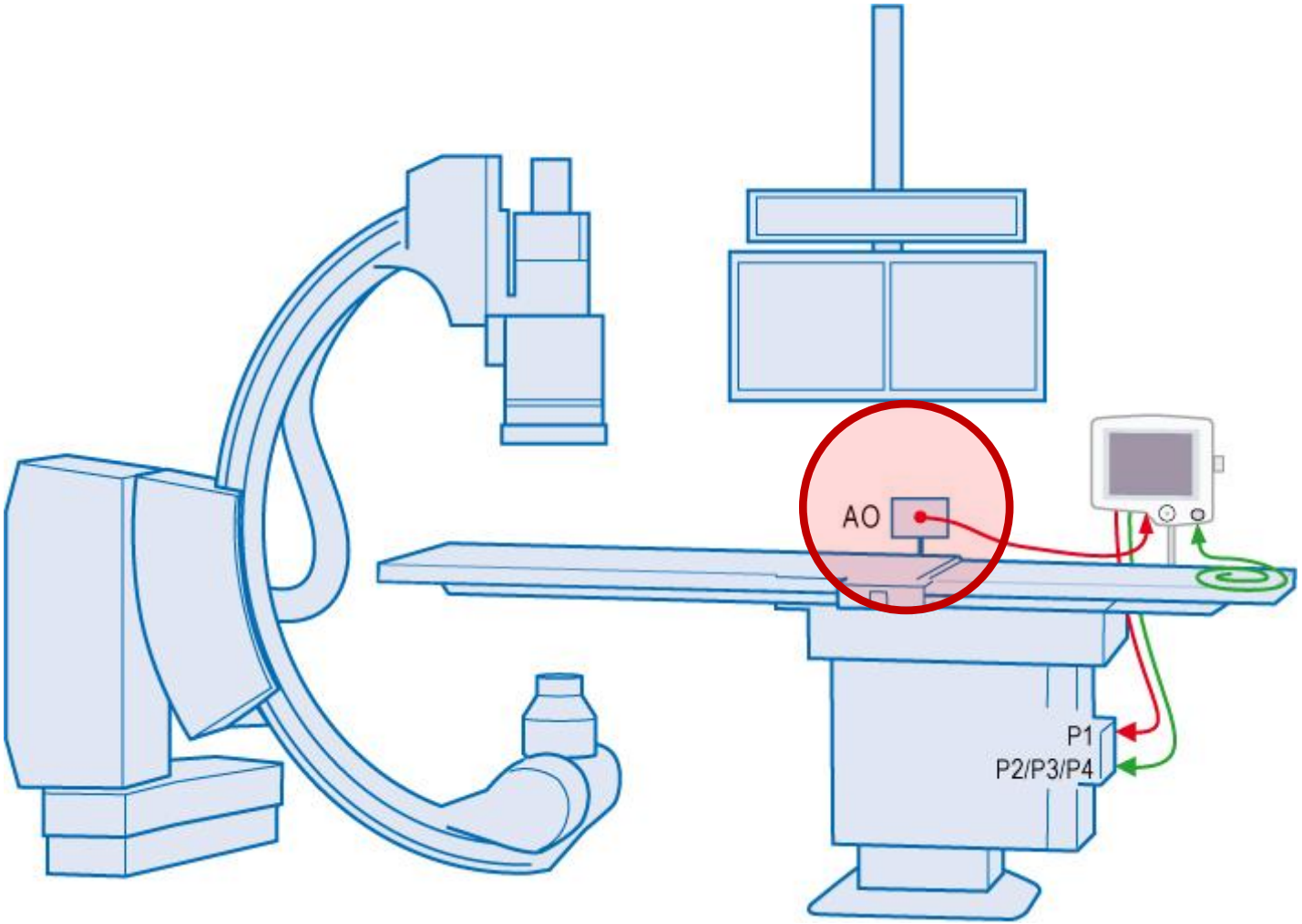
Setting in the cathlab



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Calibration: Position of the Transducer

- Aortic pressure is measured by the **fluid filled guiding catheter**
- Its value is a **relative pressure**, compared to the reference, measured at the transducer
- **Height of the transducer** has a measurable impact on the value

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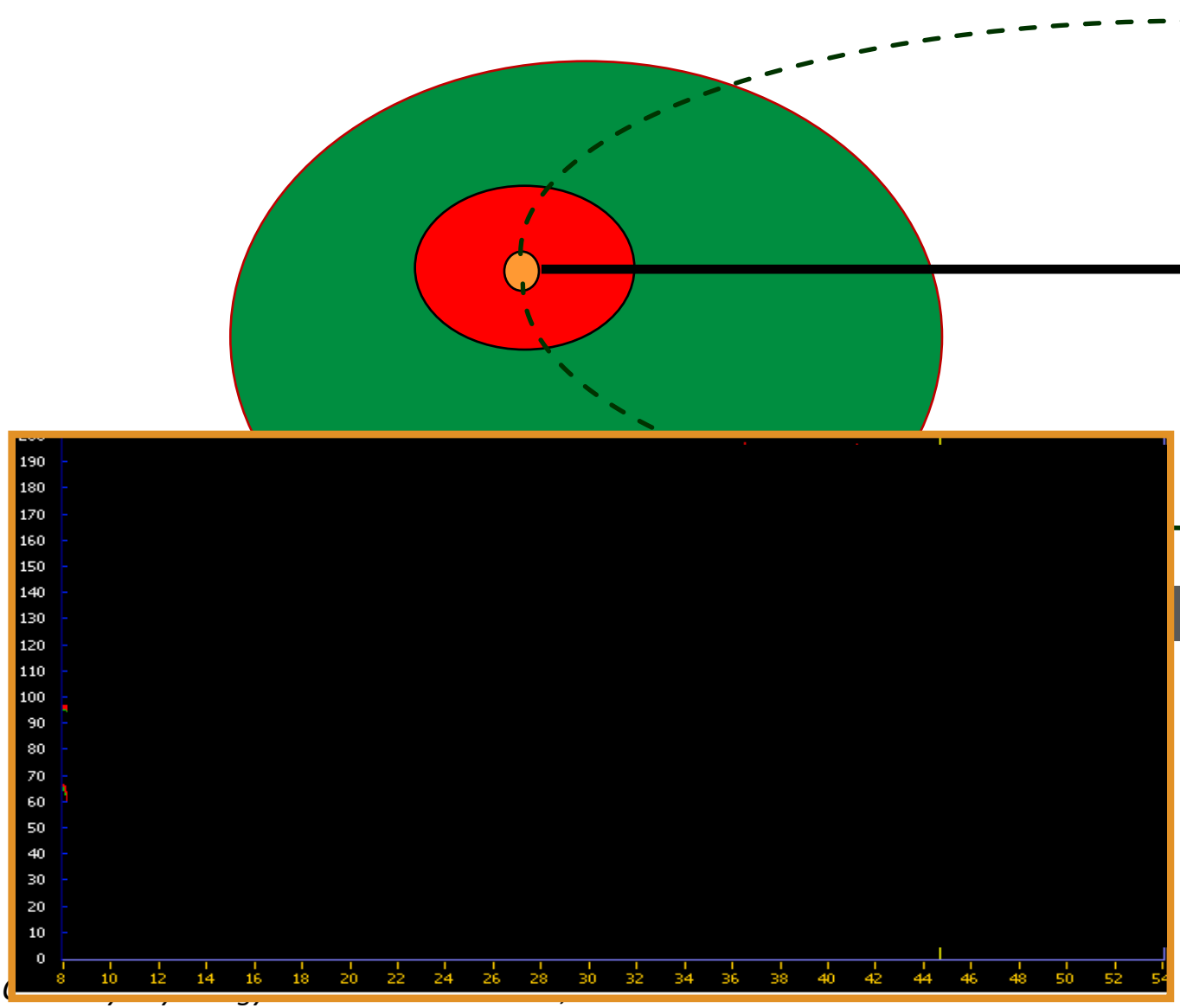
Calibration: Position of the Transducer



Pressure TOO LOW

Pressure OK

Pressure TOO HIGH

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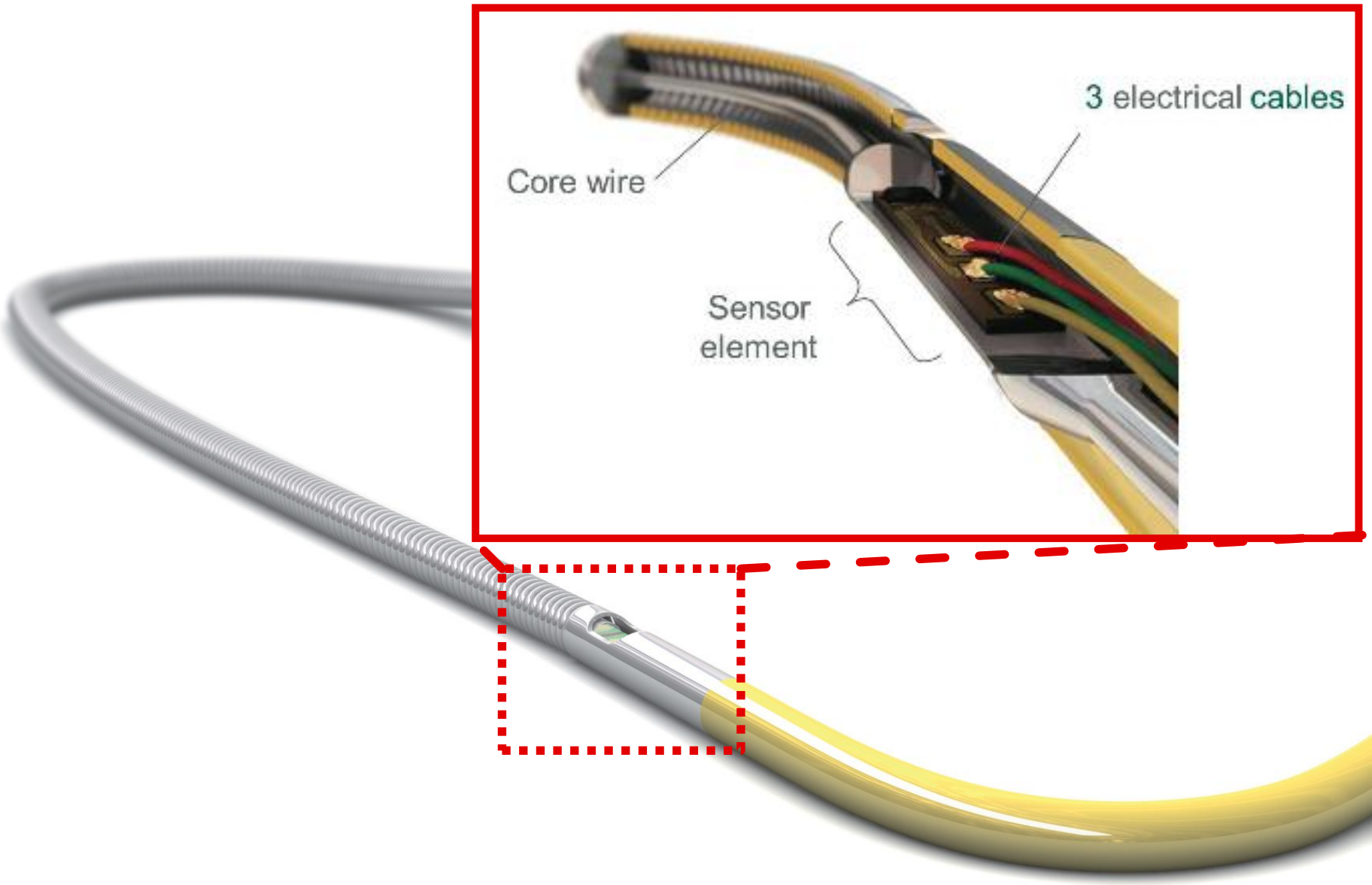
Calibration: PressureWire



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Calibration: PressureWire

- **Fill the tube of the wire with saline**


RADI

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Calibration: PressureWire

- **Fill the tube of the wire with saline**
- **Wait a minute to have the system stabilized**
- **Perform calibration afterwards**

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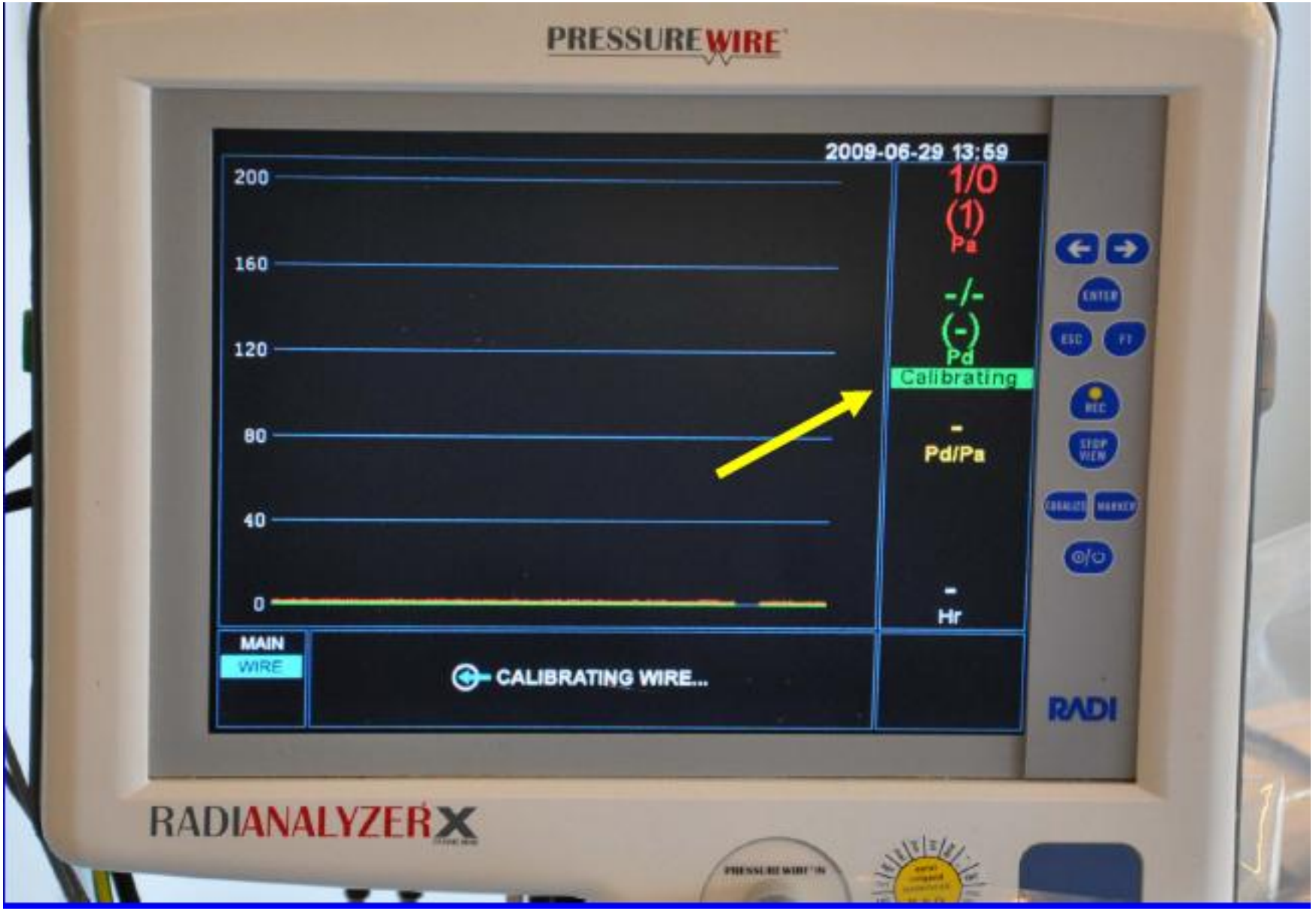
PRESSUREWIRE
2009-06-29 13:59
200
160
120
80
40
0
1/0
(1)
Pa
-/-
(-)
Pd
Calibrating
-
Pd/Pa
-
Hr
MAIN
WIRE
CALIBRATING WIRE...
RADI
RADIANALYZER X

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Equalization

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‘teaching’ the two systems, to speak the same language

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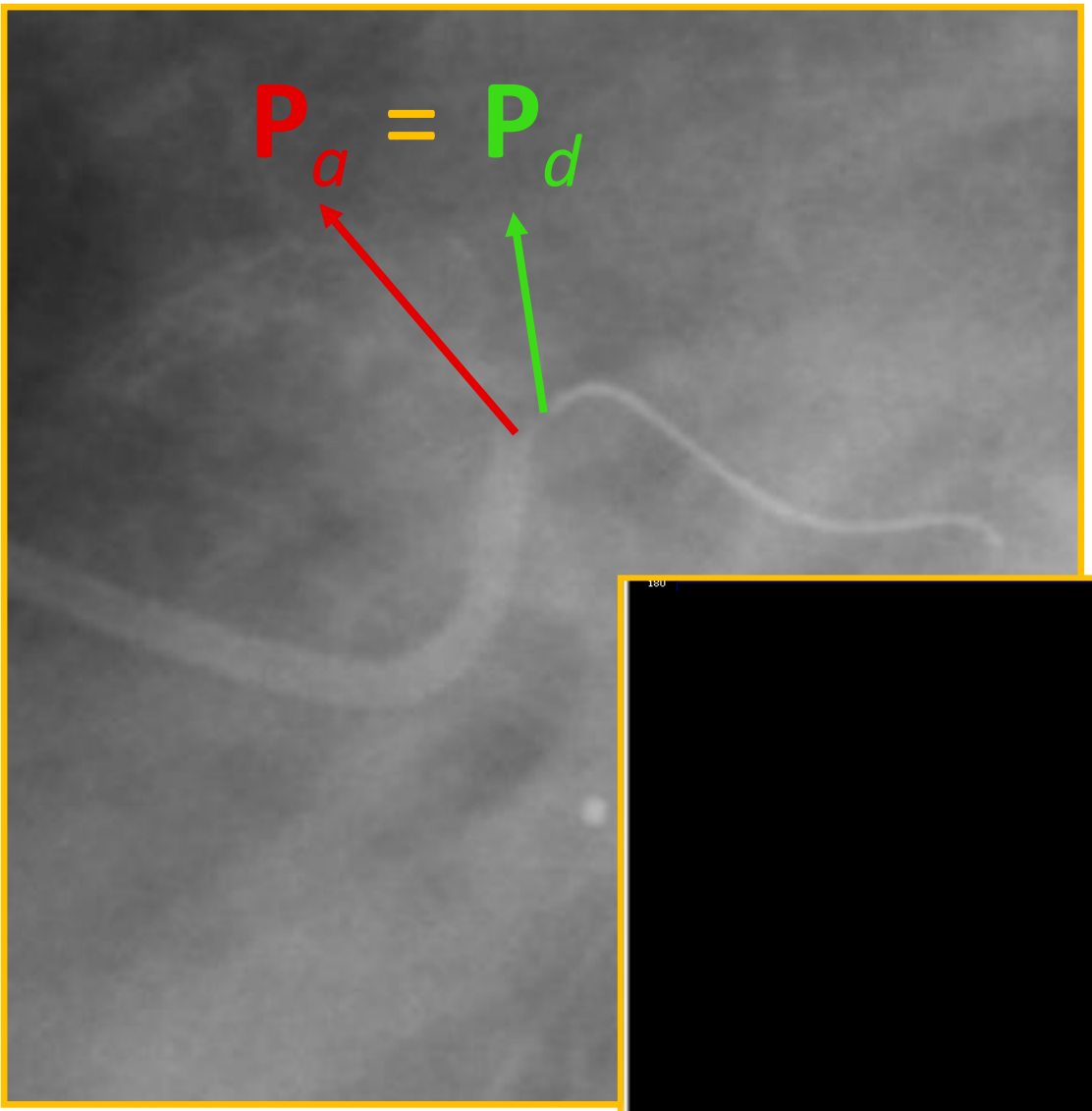
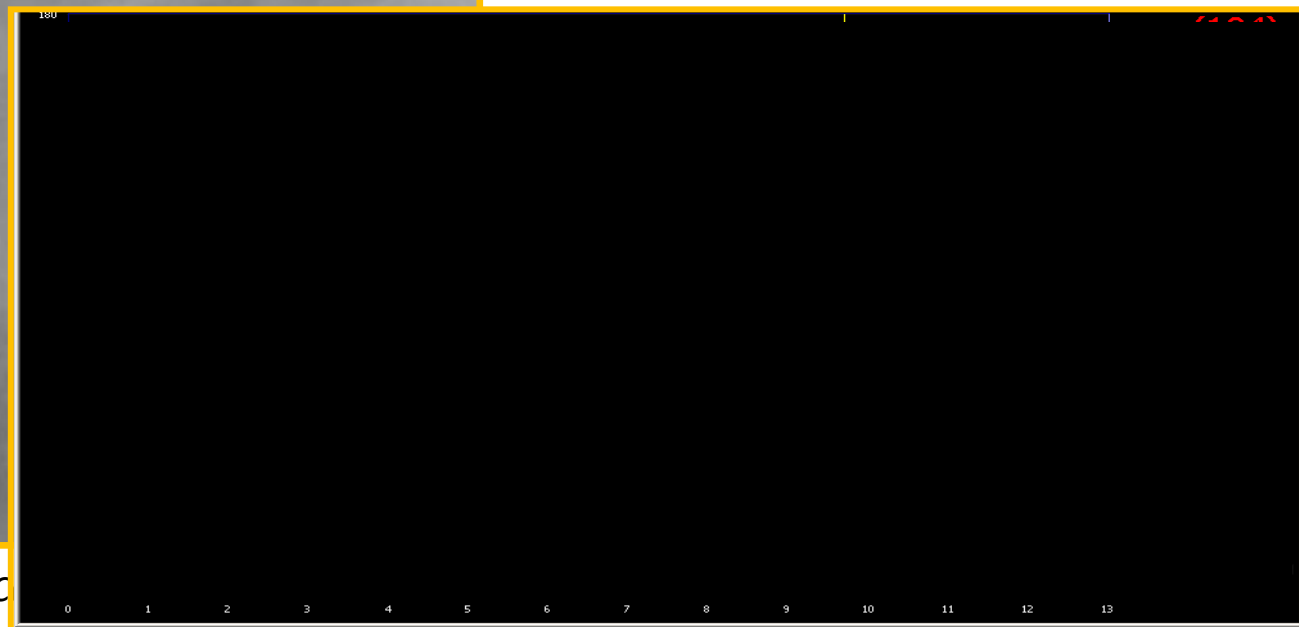
Equalization





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After equalization

DO NOT CHANGE YOUR SETTING

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Pitfalls can be related to....

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- **Drifting**
- **Hyperaemia**
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Drifting

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When the two systems forget to speak the same language …

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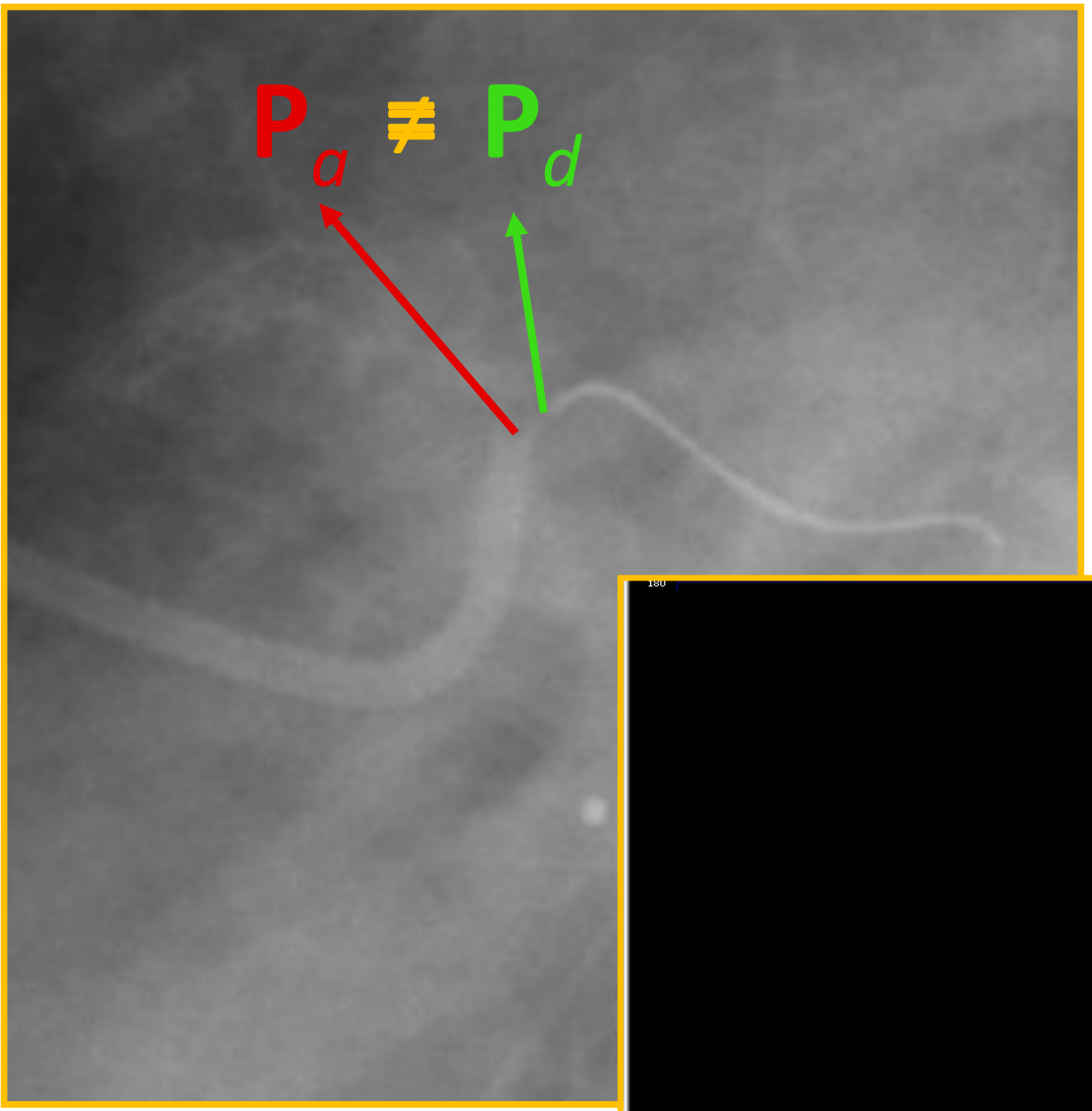
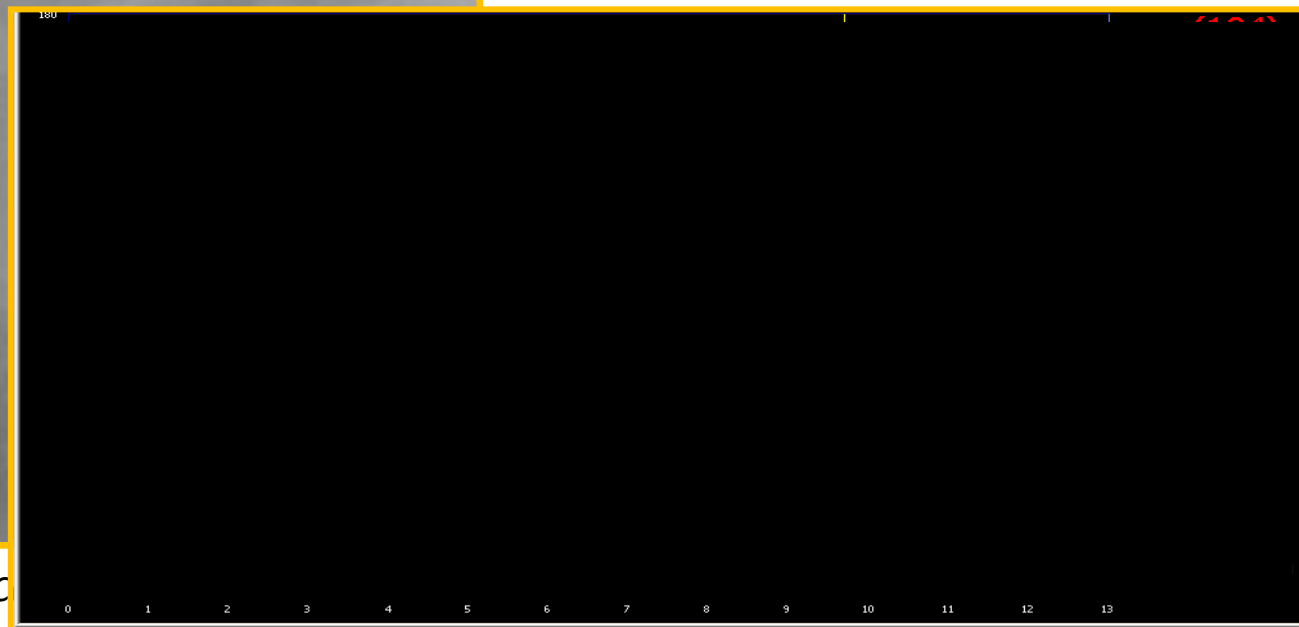
Post-measurement check



Drift!!!



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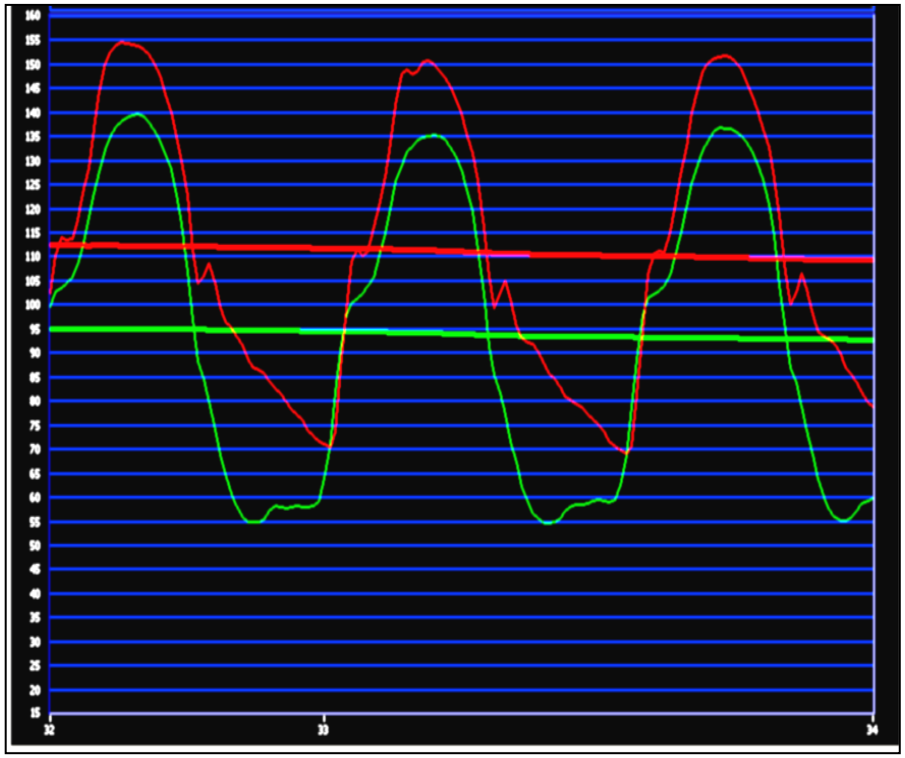
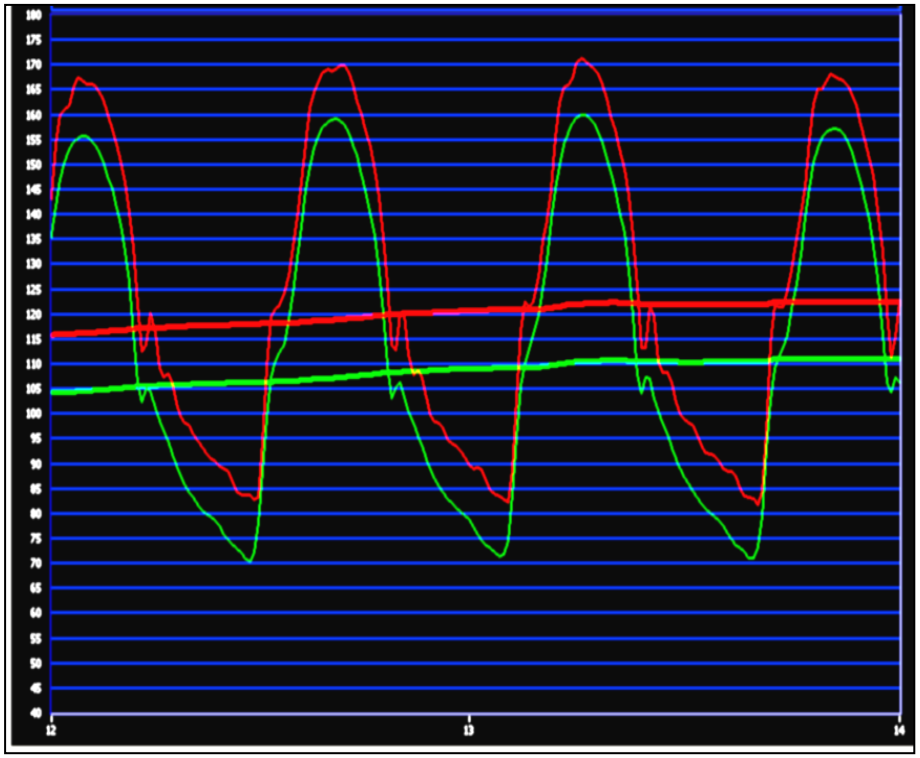
Drift vs Gradient ??





True Gradient

Different morphology

Dicrotic notch not visible

Drift

Same morphology

Paralell shifting

Dicrotic notch well visible

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Hyperaemia

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No hyperaemia …?
… no FFR!

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Wedging

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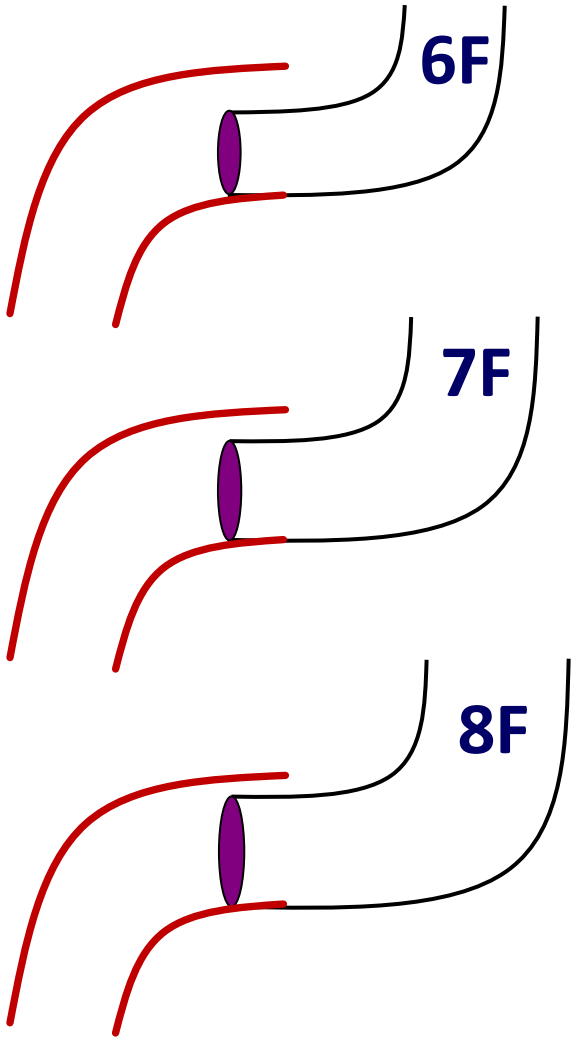
Aortic pressure is inaccurately measured...

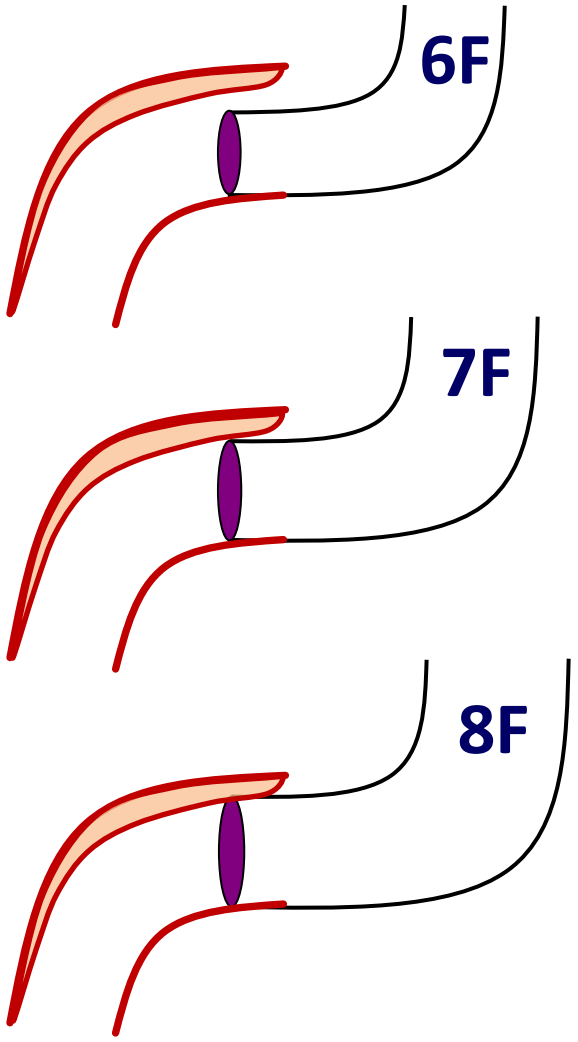
Size of the guiding catheter



Induced area stenosis

Size of the guiding catheter

Induced area stenosis



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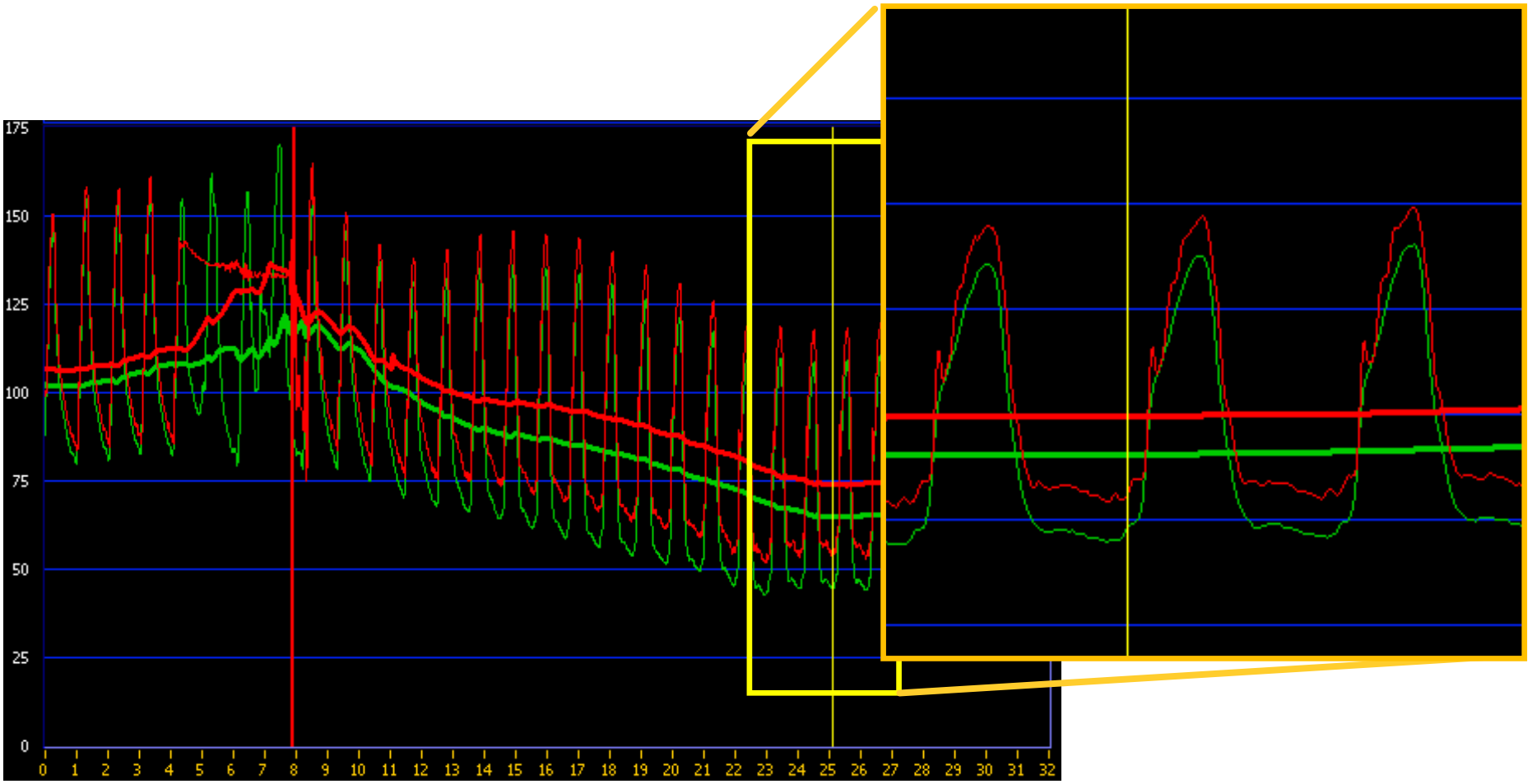
Wedging guiding catheter



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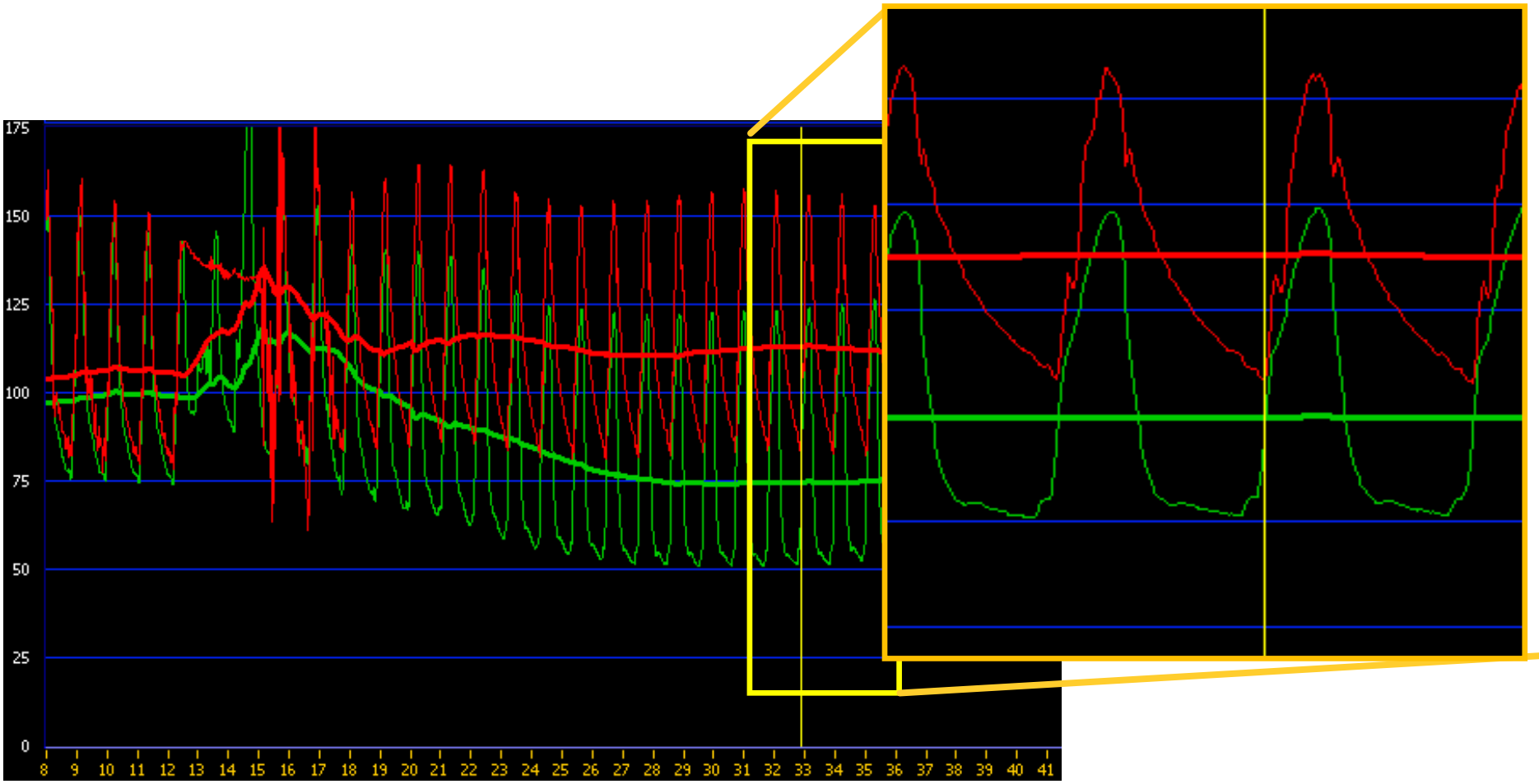
Disengaged guiding catheter



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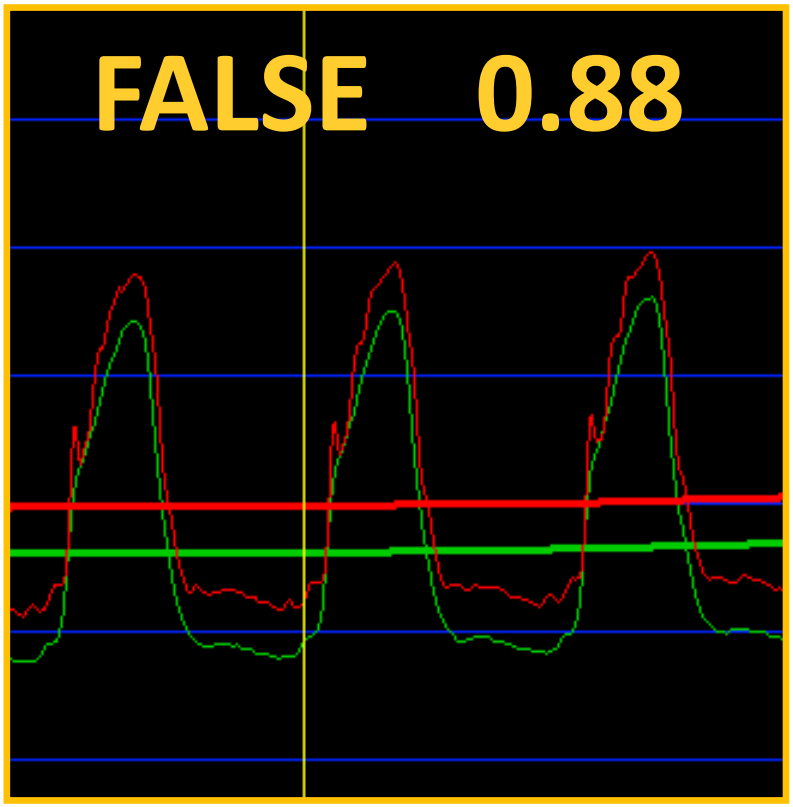
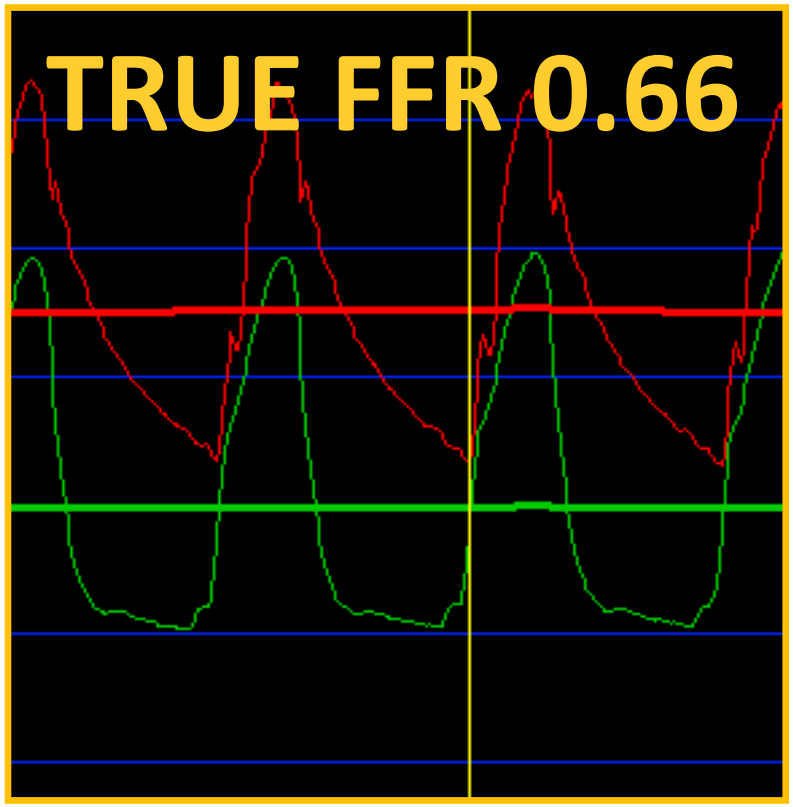
Wedging guiding catheter





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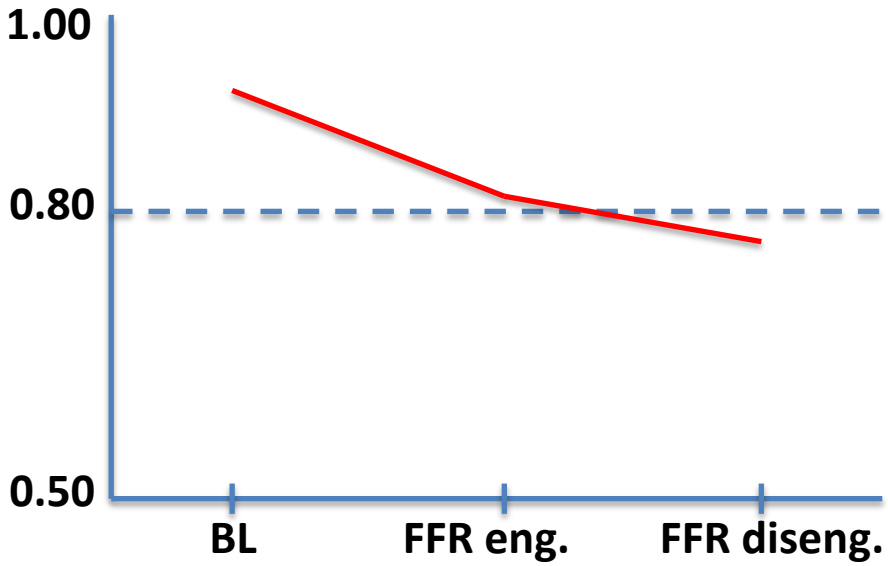
Functional wedging of guiding catheter



Slight reduction in hyperemic Pd/Pa at disengangement that with values close to the threshold resulted into transition of 0.80 in 30% of the cases

Aminian A et al. CCI 2015

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Whipping

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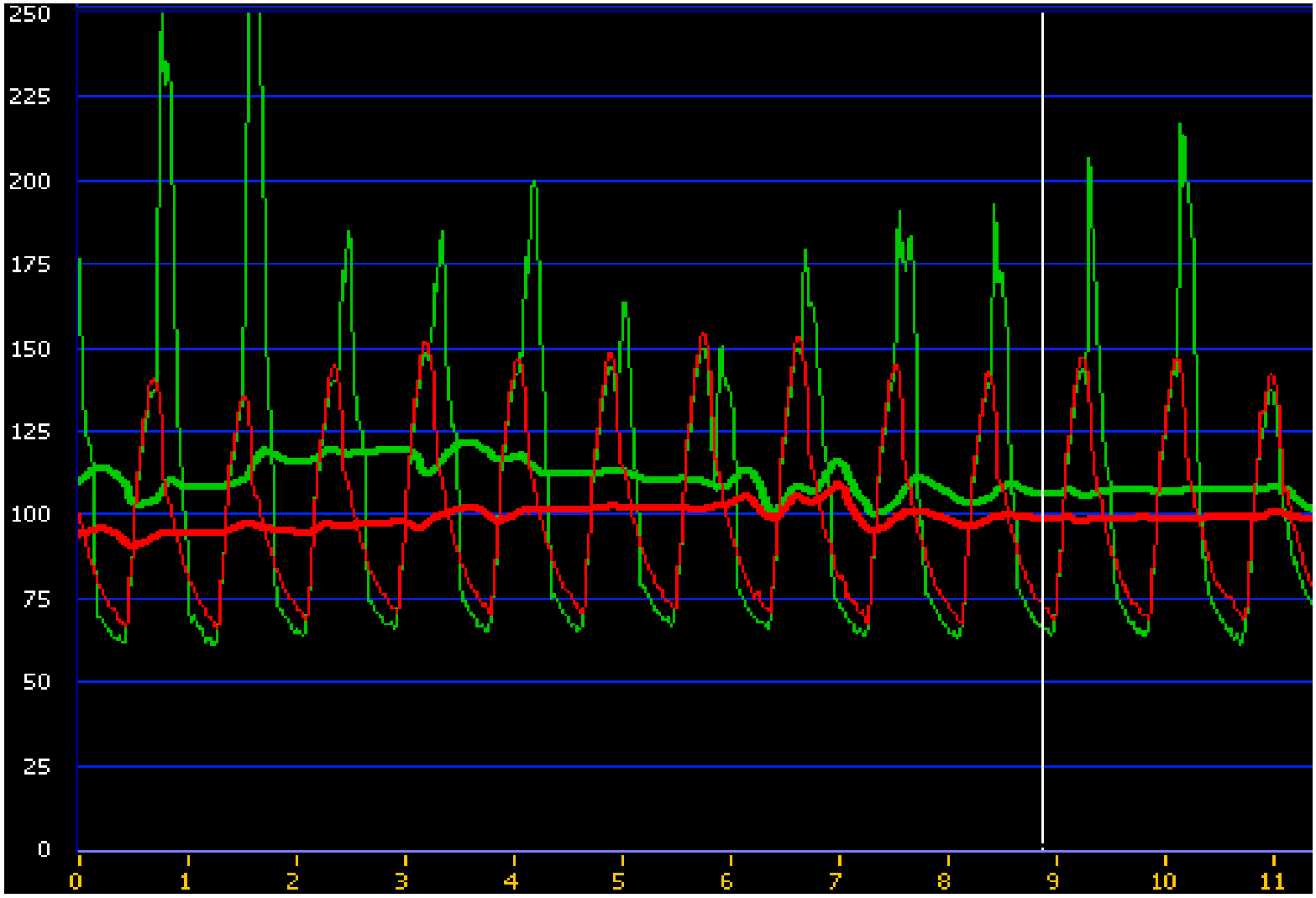
Whipping



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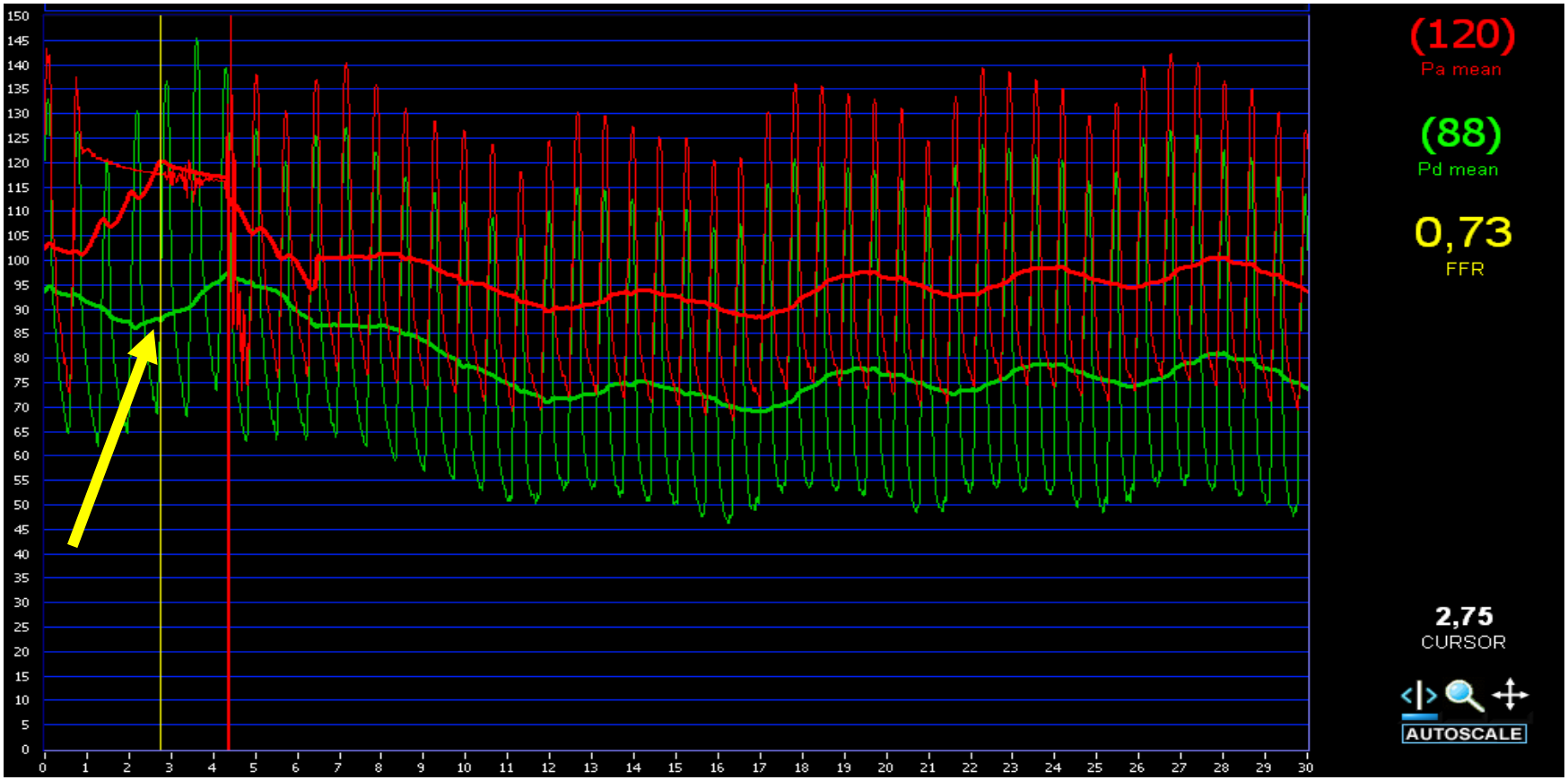
Position the cursor to the lowest value where indeed FFR was measured



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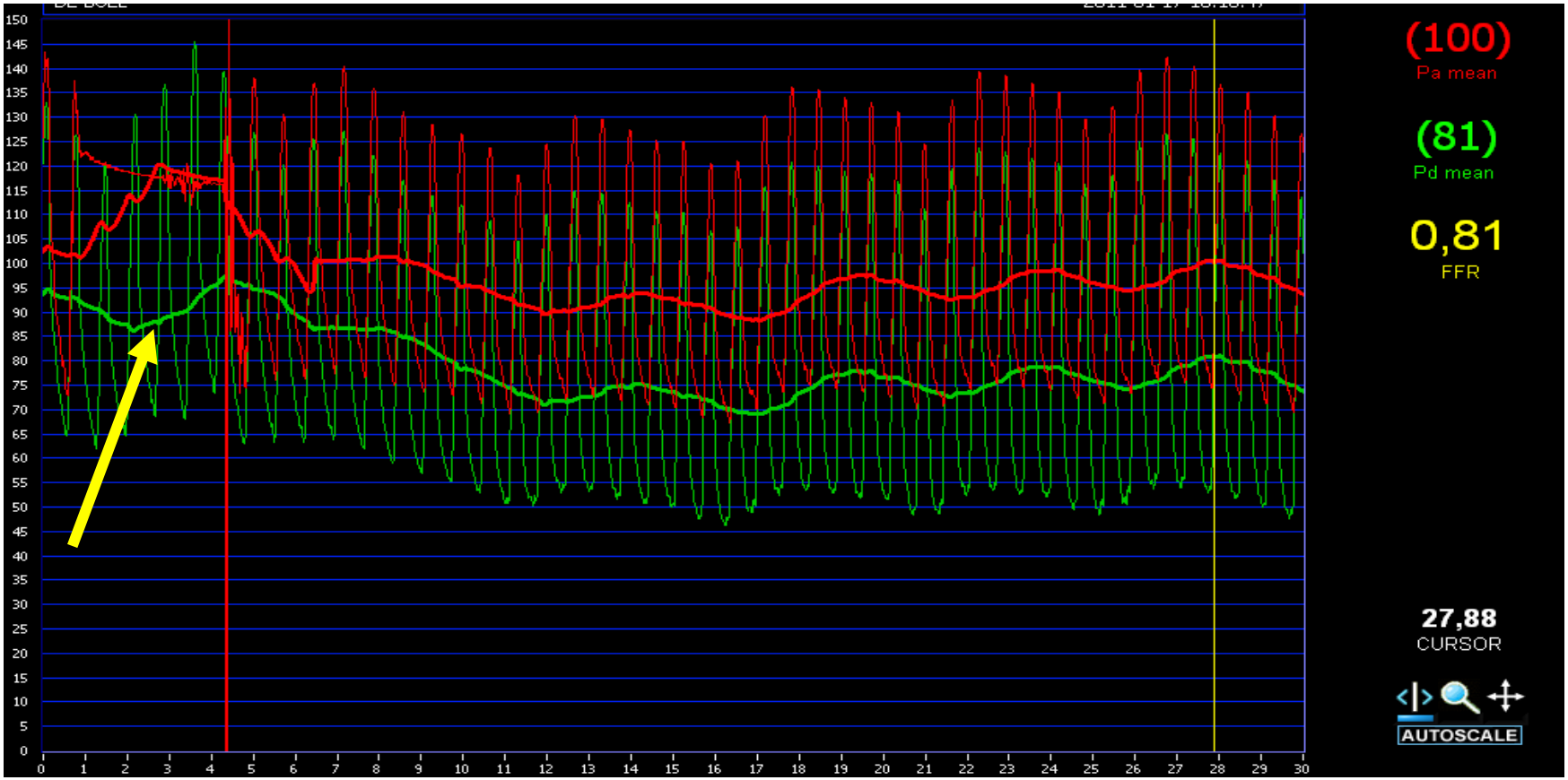

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Fractional flow reserve measurement

Obtain accurate measurements

Induce proper maximal hyperaemia

Reading the pressure tracings appropriately

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Thank you for your attention!

➔ **Credit for the slides to Dr. Gabor Toth and Nico Pijls**

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Fractional flow reserve measurement

~~Maximal~~ **hyperaemia**

~~Accurate~~ **distal coronary pressure (P_d)**

~~Accurate~~ **aortic pressure (P_a)**

~~FFR~~

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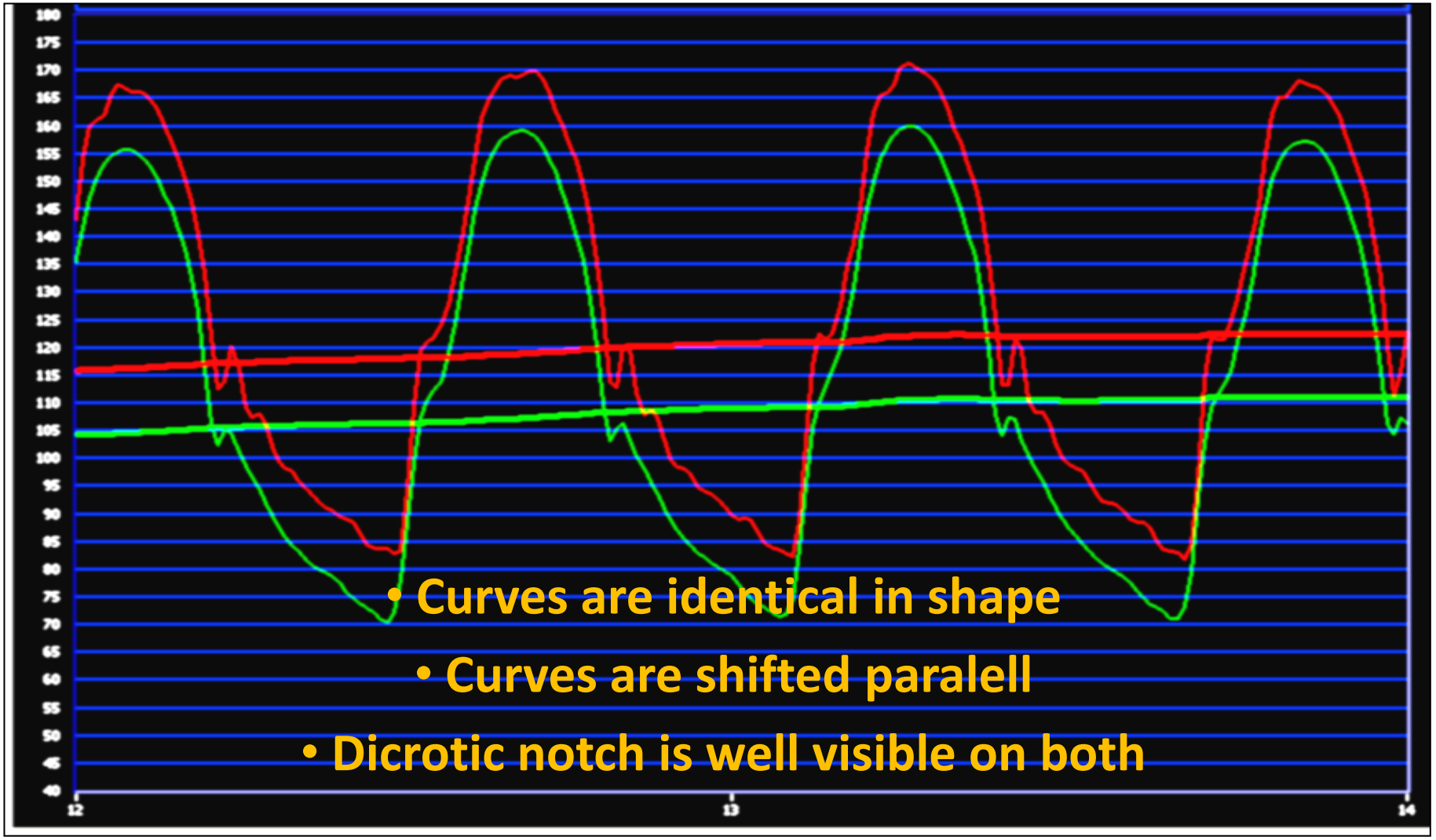
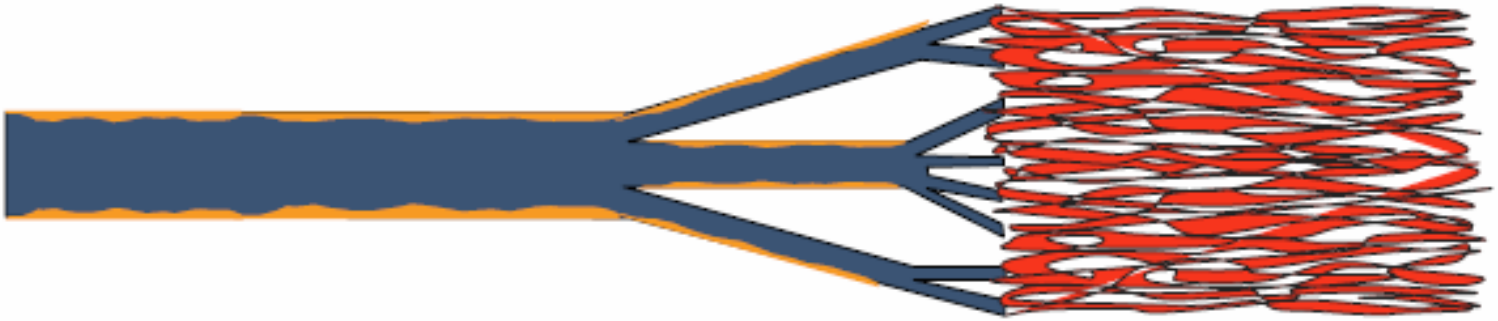
Drift vs Gradient ??



Importance of Maximal Vasodilation

Epicardial
= Conductance
Arteries > 550 µ

Microvasculature
= Resistance
Arteries < 550 µ



Nitrates → ~~Vasospasm~~

Adenosine → ~~Autoregulation~~

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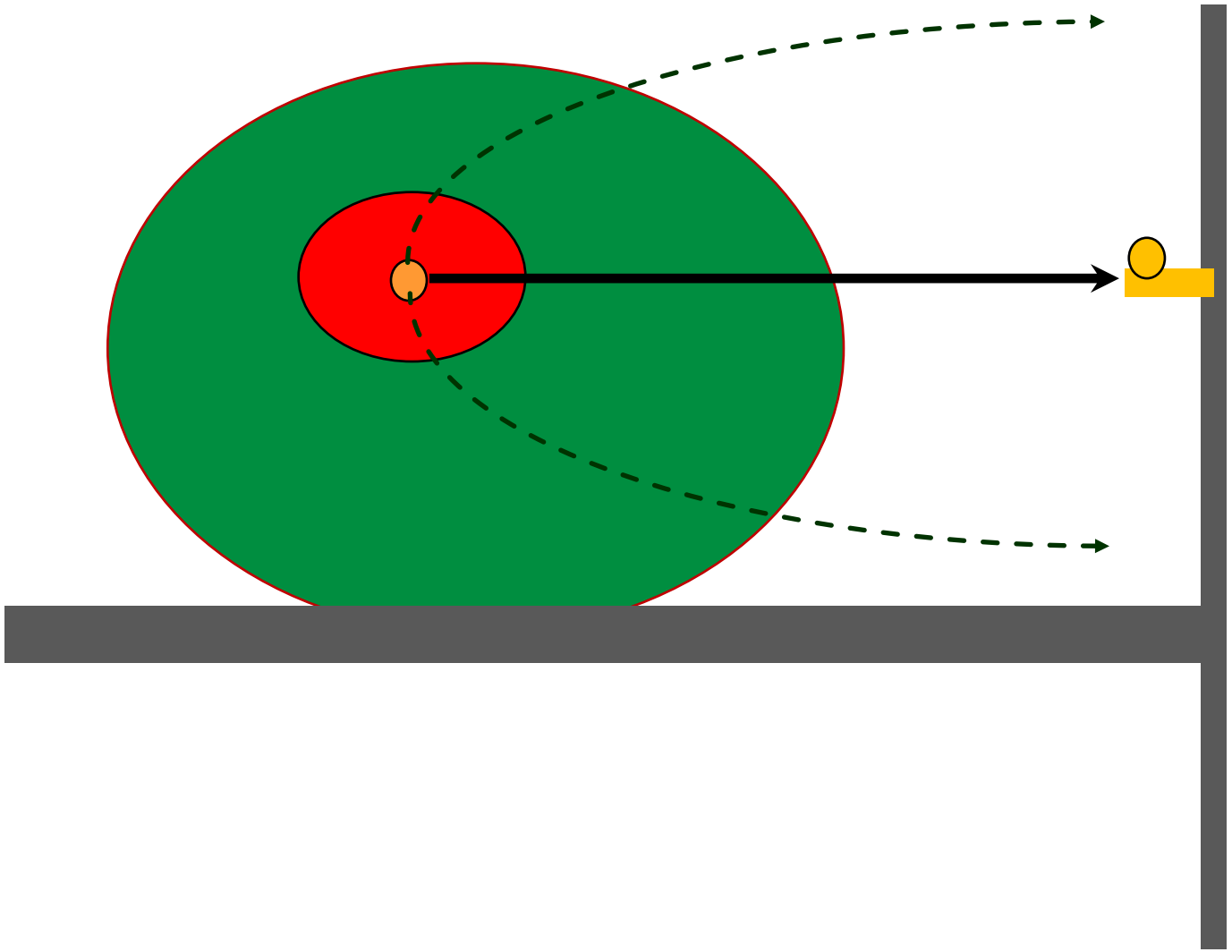
Insufficient hyperaemia

Underestimation of the gradient

Overestimation of the FFR

Underestimation of disease

Calibration: Position of the Transducer



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Setting in the cathlab